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Economic Commission for Europe**Inland Transport Committee****Working Party on the Transport of Dangerous Goods****Joint Meeting of the RID Committee of Experts and the
Working Party on the Transport of Dangerous Goods**

Bern, 16–20 March 2020

Item 2 of the provisional agenda

Tanks**Method of heat treatment of materials for welded shells
(6.8.2.1.10, 6.8.2.1.11 and 6.8.2.6.1)**

Transmitted by the Government of the Russian Federation*, **

Summary

Executive summary: The purpose of this document is to clarify the requirements of 6.8.2.1.10 and 6.8.2.1.11 in respect of restrictions on the rolling process used for manufacturing welded steel shells. Such clarification will make it possible to harmonize the requirements of EN 13445-2 and RID.

Action to be taken: Delete from 6.8.2.1.10 the requirement barring the use of water-quenched steel. Delete from 6.8.2.1.11 the restriction on the Re/Rm ratio.

Introduction

1. The current wording of 6.8.2.1.10 prohibits the use of water-quenched steel (in *italics*):
6.8.2.1.10 ...
Water-quenched steel may not be used for manufacturing welded steel shells. ...
2. The current wording of 6.8.2.1.11 places restrictions on the Re/Rm ratio (in *italics*):

* In accordance with the programme of work of the Inland Transport Committee for 2018-2019, (ECE/TRANS/WP.15/237, annex V, (9.2)).

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- 6.8.2.1.11 ...
Ratios of Re/Rm exceeding 0.85 are not allowed for steels used in the construction of welded tanks. ...

3. The current wording of 6.8.2.6.1 contains a reference to EN 14025:

Reference	Title of document	Applicable sub-sections and paragraphs	Applicable for new type approvals or for renewals	Latest date for withdrawal of existing type approvals
(1)	(2)	(3)	(4)	(5)
<i>For design and construction of tanks</i>				
EN 14025:2003 + AC:2005	Tanks for the transport of dangerous goods – Metallic pressure tanks – Design and construction	6.8.2.1	Between 1 January 2005 and 30 June 2009	
EN 14025:2008	Tanks for the transport of dangerous goods – Metallic pressure tanks – Design and construction	6.8.2.1 and 6.8.3.1	Between 1 January 2009 and 31 December 2016	
EN 14025:2013	Tanks for the transport of dangerous goods – Metallic pressure tanks – Design and construction	6.8.2.1 and 6.8.3.1	Between 1 January 2015 and 31 December 2018	
EN 14025:2013 + A1:2016 (except Annex B)	Tanks for the transport of dangerous goods – Metallic pressure tanks – Design and construction	6.8.2.1 and 6.8.3.1	Until further notice	

4. Paragraph 4.1 of EN 14025 provides that the tank material must comply with EN 13445-2.

Proposals

Proposal 1

Delete from 6.8.2.1.10 the sentence: “Water-quenched steel may not be used for welded steel shells.”

Proposal 2

Delete from 6.8.2.1.11 the sentence: “Ratios of Re/Rm exceeding 0.85 are not allowed for steels used in the construction of welded tanks.”

Justification

5. EN 13445-2 provides for three processes for flat rolled steel production: “normalizing”, “thermomechanical treatment” and “quenching and tempering”:

Table E.1-1 — European Standards for steels and steel components for pressure purposes

Product form	General requirements	Room temperature grades ^a	Elevated temperature grades	Fine grain steels			Low temperature grades	Stainless steels
				Normalised	Thermo-mechanically treated	Quenched and tempered		
Plate and strip	EN 10028-1	—	EN 10028-2	EN 10028-3	EN 10028-5	EN 10028-6	EN 10028-4	EN 10028-7

6. 6.8.2.1.10 can be interpreted in different ways:

Variant 1. The paragraph does not refer to the tempering process, so rolled products manufactured using the quenching and tempering process may be used;

Variant 2. The paragraph is about the quenching and tempering process, so only rolled products manufactured using the normalizing or thermomechanical treatment processes may be used.

7. If rolled products with sufficiently strong mechanical properties (e.g. yield strength of 390 MPa or higher) are used, the requirements of 6.8.2.1.11 concerning the Re/Rm ratio would make it impossible to use the thermomechanical treatment process, as the resulting Re/Rm ratio will always exceed 0.85.

Therefore, if 6.8.2.1.10 is actually about quenching and tempering, welded boilers can only be produced using rolled products manufactured using the normalizing process.

8. GOST standard 5520-2017 on “Rolled non-alloy and alloy steel plates for boilers and pressure vessels. Specifications” does not place any restriction on the technology for manufacturing welded boilers for tank-wagons:

4. Classification and designations

4.1. Steel is subdivided:

- by chemical composition into:
 - non-alloyed;
 - alloyed.

4.2. Rolled products are subdivided:

- into categories depending on their standard mechanical properties: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24;
- by as-delivered condition:
 - heat-treated, including with hot-rolling, followed by:

- (a) normalizing – N;
- (b) normalizing and tempering – N+T;
- (c) quenching and tempering – Q+T;
- (d) tempering – T;
- (e) annealing – A;

thermomechanically-treated:

- (a) controlled rolled, including with accelerated cooling – CR;
- (b) controlled rolled, including with accelerated cooling, and high tempered – CRT;

without heat treatment (in hot-rolled state) – HR.